

a body passage extending from the inlet portion to the outlet portion along the longitudinal axis of the fuel injector;

an armature proximate the inlet portion of the body;

a cylindrical needle operatively connected to the armature;

a seat protruding from the outlet portion of the body; and

a swirl generator proximate the seat;

wherein the cylindrical annulus of the body includes an inner diameter that is greater than a diameter of the cylindrical needle so as to define the body passage, which maintains an operative relationship between the body and the needle.

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3.(Amended) The fuel injector of claim 1, wherein the seat comprises a first surface exposed to the fuel passageway and a second surface exposed to an exterior of the fuel injector, the first surface being spaced from the second surface a defined distance along the longitudinal axis, the first surface having at least one cut-out configuration that extends for a fraction of the defined distance into an interior of seat.

6.(Amended) A fuel injector having a fuel inlet, a fuel outlet, and a fuel passageway extending from the fuel inlet to the fuel outlet along a longitudinal axis, the fuel injector comprising:

a body having an inlet portion, an outlet portion, and a body passage extending from the inlet portion to the outlet portion along the longitudinal axis;

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an armature proximate the inlet portion of the body;

a needle operatively connected to the armature;

a swirl generator proximate the needle;

a seat protruding from the outlet portion of said body, the seat including a first surface exposed to the body passage and a second surface exposed to an exterior of the fuel injector, the first surface being spaced from the second surface a defined distance along the longitudinal axis,

~~19~~ the first portion having at least one cut-out configuration that extends from the first surface for a fraction of the defined distance into an interior of seat.

~~Sub B7~~ 20.(Amended) A method of stabilizing temperature of a fuel injector in a direct injection application, the fuel injector having a body; an armature proximate an inlet of the body; a needle operatively connected to the armature; a seat protruding from the body; and a swirl generator proximate the seat, the method comprising:

~~17~~ providing the needle with a substantially uniform cross-sectional area; and

~~17~~ selecting the body to surround the needle and form a body passage, the body passage maintains an operative relationship between the body and the needle;

~~17~~ wherein fuel in the body passage transfers heat from the body to the needle to maintain a minimum temperature gradient and to maintain an operative relationship between the body and the needle.

~~Sub C4~~ 21.(Amended) The method of claim 20, wherein an average cross-sectional area of the body passage is less than 2.25 times the substantially uniform cross-sectional area of the needle.
